

Serial No.: 10/790,792
Docket No.: 102-1019
Response dated: March 27, 2007
Reply to the Office Action of January 16, 2007

REMARKS

Introduction

Upon entry of the foregoing amendment, claims 1, 2, 4, and 6-27 are pending in the application. Claims 23-27 have been withdrawn. No claims have been amended. No new matter is being presented. In view of the following remarks, reconsideration and allowance of all the pending claims are requested.

Rejection under 35 USC § 112: Claims 7 and 15:

In the Office Action of 16 January 2007, claims 7 and 15 have been rejected under 35 U.S.C. 112, second paragraph, as being indefinite. In particular, the Examiner states that claims 7 and 15 fail to particularly "point out and distinctly claim the subject matter which the Applicant regards as the invention, that is, 'cleaning an organic material having flown in the wafer.'"

Claims 7 and 15 have been previously amended for clarity. Accordingly, Applicants respectfully submit that, as amended, claims 7 and 15 are not indefinite, and are clear to one of ordinary skill in the art. In particular, as disclosed in the present specification, the forming of the preliminary ink passage 2' on the wafer 1 and the dicing of the wafer 1 using the liquid-jet guided laser results in organic materials flowing to the surfaces of the wafer 1. One of ordinary skill in the art would understand that the limitations "cleaning an organic material having flown onto the wafer" as recited in claim 7 and "cleaning an organic material having flown onto the print heads" as recited in claim 15 refer to removing the organic material that has flown to the surface of the wafer 1 during the forming of the preliminary ink passage 2' and during the dicing of the wafer 1. Accordingly, claims 7 and 15 satisfy all of the requirements of 35 U.S.C. §112, second paragraph, and thus, reconsideration and withdrawal of this rejection are respectfully requested.

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Rejection under 35 USC § 103(a): Richerzhagen, Yamamoto, Merdan, and Peng:

Claims 1-2, 4, 6-7, 9, and 15-22 have been rejected under 35 U.S.C. §103(a) as being unpatentable over U.S. Patent No. 5,902,499 to Richerzhagen in view of U.S. Patent No. 5,482,660 to Yamamoto et al., U.S. Patent No. 6,696,666 to Merdan et al., and U.S. Patent No. 6,737,606 to Peng et al. The Applicant respectfully traverses this rejection for at least the following reasons.

Claim 1:

With respect to claim 1, on page 3 of the Office Action of 16 January 2007, the Examiner alleges that:

Richerzhagen discloses a laser and liquid jet for material machining. The system has a processing module (housing) and the workpiece is cut using the laser-liquid jet device. ND:YAG lasers may be used. Pressure range from about 10 bars to 1000 bars. Nozzles are sizes from 5 to 50um. A conical shape may be used for focusing.

The Examiner then admits that "Richerzhagen does not teach the presence of a wafer, or a stage or all types of lasers or the laser beam diameter." However, the Examiner then alleges that:

Yamamoto et al. discloses the fabrication of an ink jet head. Side and top-down jets are taught. An excimer laser beam is irradiation (sic) on the discharge port face and the stage is moved with the substrate thereon. The substrate may be made of glass, quartz and ceramic.

The Examiner then also alleges that "it would have been obvious... to use a stage and wafer, as taught by Yamamoto et al. in the Richerzhagen process because the state enhance versatility during fabrication and the use of a wafer is merely a design choice."

The Examiner then cites Merdan et al. to allege that it "discloses the use of hybrid laser water systems (laser micro-jet)," that "[t]ypes of lasers suitable for use with this system are YAG lasers, IR lasers, CO2 lasers, diode lasers, and any combination thereof," and that "it would have been obvious...to use different type of lasers as taught by Merdan et al. because this is drawn to the same liquid jet guided laser."

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Next, the Examiner then cites Peng et al. to allege that it "discloses the use of laser beam liquid assembly for the dicing of wafers", that "[t]he liquid stream has a diameter equal to the laser beam diameter, which is about 50 to 150 μm ," and that "[it] would have been obvious... to note the diameter as taught by Peng et al. because these parameters are based on the same liquid jet guided laser." However, Applicant respectfully submits that these references do not disclose the Applicant's invention as recited in claim 1, either individually or combined.

Richerzhagen:

With respect to Richerzhagen, while the Examiner admits that "Richerzhagen does not teach the presence of a wafer, or a stage or all types of lasers or the laser beam diameter," see Office Action of 16 January 2007, page 3, the Examiner does not point out where any of the limitations of claim 1 are disclosed in Richerzhagen. Instead the Examiner simply states that "Richerzhagen discloses a laser and liquid jet for material machining." Such a blanket type coverage rejection does not provide Applicant with an opportunity to respond to the Examiner's assertions as to whether any of the claimed features or process operations are the same or different from the cited reference. Therefore, the Applicant can only attempt to respond to this rejection in view of what can only be assumed to be what the Examiner is referring to.

Richerzhagen describes an arrangement to couple a laser beam with a fluid jet for material processing, focusing on preventing damage to the fluid jet nozzle by laser radiation. See Richerzhagen, Col. 1, lines 62-67. That is, while Richerzhagen describes that laser irradiation is used for "material processing," including cutting, drilling, welding, marking, and material stripping, see Richerzhagen, Col. 1, lines 10-14, Richerzhagen does not disclose, teach or suggest any specific material processed or any specific processing to form a desired feature on a material. Accordingly, the Applicant respectfully submits that Richerzhagen does not teach or suggest any of the features recited in claim 1. That is, among other things, Richerzhagen does not teach or suggest Applicant's "process of forming an ink feeding port through a wafer which constitutes an ink-jet print head," "fixing the wafer to a stage in a chamber to perform the process," "processing the ink feeding port in the wafer to a desired depth using a liquid-jet guided laser," and "moving the stage, on which the wafer is fixed, along an ink feeding port pattern," as recited in claim 1.

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Yamamoto et al.:

With respect to Yamamoto et al., while the Examiner alleges that it discloses "the fabrication of an ink jet," the Examiner does not point out where any of the limitations of claim 1 are disclosed in Yamamoto et al. Accordingly, the Applicant can only attempt to respond to this rejection in view of what can only be assumed to be what the Examiner is referring to. However, it is respectfully submitted that Yamamoto et al. also does not teach or suggest all of the limitations as recited in claim 1, and does not cure the deficiencies of Richerzhagen.

Yamamoto et al. describes a method to fabricate an ink jet recording head with a water-repellent discharge port face. See Yamamoto et al., Col. 3, lines 44-48. Yamamoto et al. describes the formation of a supply port 10, an ink liquid chamber 9, and ink liquid channels 8 on a ceiling plate through injection molding. See Yamamoto et al., Col. 6, lines 19-24. This is not the same as "wherein: the ink feeding port forming process comprises: fixing the wafer to a stage in a chamber to perform the process, and processing the ink feeding port in the wafer to a desired depth using a liquid-jet guided laser," as recited in claim 1.

Furthermore, Yamamoto et al. describes the use of an excimer laser to form ink discharge ports 7 after the other structures, listed above, have been formed by injection molding. See Yamamoto et al., Col. 6, lines 33-36. That is, Yamamoto describes the use of an excimer laser, which is not the same as "a liquid-jet guided laser," as recited in claim 1, to form a discharge port 7, which is also not the same as "the ink feeding port," as recited in claim 1. Accordingly, neither Richerzhagen nor Yamamoto et al., individually or combined, disclose, teach, or suggest, among other things "wherein the ink feeding port forming process comprises: fixing the wafer to a stage in a chamber to perform the process, and processing the ink feeding port in the wafer to a desired depth using a liquid-jet guided laser," and "the operation of processing the ink feeding port comprises: illuminating a laser beam guided by a liquid-jet having a diameter in the range of 10 to 500 μm through the liquid-jet guided laser," as recited in claim 1.

To establish *prima facie* obviousness of a claimed invention, all the claim limitations must be taught or suggested by the prior art. *In re Royka*, 490 F.2d 981, 180 USPQ 580 (CCPA 1974). "All words in a claim must be considered in judging the patentability of that claim against the prior art." *In re Wilson*, 424 F.2d 1382, 1385, 165 USPQ 494, 496 (CCPA 1970). If an

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independent claim is nonobvious under 35 U.S.C. 103, then any claim depending therefrom is nonobvious. *In re Fine*, 837 F.2d 1071, 5 USPQ2d 1596 (Fed. Cir. 1988).

Instead, the Examiner appears to offer its own hypothesis for expanding the nature of elements of these references, and combining them in ways not present, inherently required, or suggested by any of these references to allege they correspond to the limitations recited in claim 1. Not only does the Examiner not specifically point out which structures in Richerzhagen or Yamamoto et al. correspond to the limitations of claim 1, but at best, the Examiner seems to be arguing for impermissible hindsight.

When applying 35 U.S.C. 103, the following tenets of patent law must be adhered to:

- (A) The claimed invention must be considered as a whole;
- (B) The references must be considered as a whole and must suggest the desirability and thus the obviousness of making the combination;
- (C) The references must be viewed without the benefit of impermissible hindsight vision afforded by the claimed invention; and
- (D) Reasonable expectation of success is the standard with which obviousness is determined.

Hodosh v. Block Drug Co., Inc., 786 F.2d 1136, 1143 n.5, 229 USPQ 182, 187 n.5 (Fed. Cir. 1986). (Emphasis added).

Merdan et al.:

With respect to Merdan et al., the Examiner alleges that Merdan et al. "discloses the use of hybrid laser water systems (laser micro-jet)," that "[t]ypes of lasers suitable for use with this system are YAG lasers, IR lasers, CO2 lasers, diode lasers, and any combination thereof," and that "it would have been obvious...to use different type of lasers as taught by Merdan et al. because this is drawn to the same liquid jet guided laser." However, the Applicant respectfully submits that Merdan et al. does not disclose, teach, or suggest the limitations that are lacking from both Richerzhagen and Yamamoto et al., and that none of the references cited by the Examiner, individually or combined, disclose, teach, or suggest, all of the limitations recited in claim 1.

Merdan et al. describes a system to cut and process a hollow tube. See Merdan et al., abstract. That is, Merdan et al. describes the processing of hollow tubular members, suitable for implantation into the human body lumen and coated with lubricants or drug vectors, using a

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laser. See Merdan et al., Col. 4, lines 16+, Col. 5, 1-27. Further, Merdan et al. limits the types of lasers it system uses to lasers "suitable for use in processing tubular members," see Merdan et al., Col. 5, lines 32-34, and uses a fluid column flowing through the inside of the hollow tubular member to prevent the laser used from impacting an interior surface of the tubular member as it's being processed. See Merdan et al., Col. 5, lines 37-47. That is, Merdan et al. describes that a YAG laser, an IR laser, A UV laser, a CO2 laser, a diode laser, or a combination thereof, may be used to process hollow tubes while using a water column flowing through the tube to disrupt the laser energy and prevent the laser from impacting the interior surface of the tube. Accordingly, neither Richerzhagen, Yamamoto et al. nor Merdan et al. teach or suggest, among other things, "wherein the ink feeding port forming process comprises: fixing the wafer to a stage in a chamber to perform the process, and processing the ink feeding port in the wafer to a desired depth using a liquid-jet guided laser," and "the operation of processing the ink feeding port comprises: illuminating a laser beam guided by a liquid-jet having a diameter in the range of 10 to 500 μm through the liquid-jet guided laser," as recited in claim 1.

Furthermore, it is respectfully submitted that Merdan et al. cannot be used to form an obviousness type rejection because it is not analogous art. To be analogous prior art, Merdan et al. must either be in the field of the claimed invention, or must be reasonably pertinent to the problem with which the claimed invention is concerned. See In re Oetiker, 977 F.2d 1443 and MPEP §2141.01(a). However, it is respectfully submitted that Merdan et al. is not in the same field as the Applicant's inventions and it is also not pertinent to the problem addressed by the Applicant's invention.

Merdan et al. describes the formation of stents, that is, of hollow tubular medical devices that are usually coated with drugs and inserted into the human body. See Merdan et al., Col. 15-23. That is, Merdan et al. has nothing to do with the fabrication of ink-jet print heads, and therefore is not in the same field of art as the Applicant's invention. Furthermore, Merdan et al. is limited to describing the processing of hollow tubes using a laser, and using a fluid column flowing through the hollow tube to disrupt the laser energy and prevent the laser from impacting an interior surface of the hollow tube. See Merdan et al., Col. 5, lines 32-34, and 37-47. That is, Merdan et al. is not pertinent to the problem of forming an ink feeding port through a wafer which constitutes an ink jet print head as addressed by the Applicant's invention.

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Accordingly, Merdan et al. is not analogous art with respect to the Applicant's invention, and therefore cannot be used in combination with Richerzhagen, Yamamoto et al., or Peng et al. to form an obviousness type rejection. Thus, the rejection of claim 1 in view of Richerzhagen, Yamamoto et al., Merdan et al. and Peng et al. is left unsupported, and withdrawal of this rejection and allowance of this claim is respectfully requested.

Peng et al.:

With respect to Peng et al., the Examiner cites Peng et al. merely to allege that it "discloses the use of laser beam liquid assembly for the dicing of wafers", and that "[t]he liquid stream has a diameter equal to the laser beam diameter, which is about 50 to 150 μm ." However, Peng et al. does not disclose, teach, or suggest, all of the limitations present in claim 1 lacking in the cited references. For Example, Peng et al. does not disclose, teach, or suggest, among other things "wherein the ink feeding port forming process comprises: fixing the wafer to a stage in a chamber to perform the process, and processing the ink feeding port in the wafer to a desired depth using a liquid-jet guided laser," and "the operation of processing the ink feeding port comprises: illuminating a laser beam guided by a liquid-jet having a diameter in the range of 10 to 500 μm through the liquid-jet guided laser," as recited in claim 1.

Accordingly, for at least the reason that Peng et al. does not disclose, teach, or suggest, any of the limitations that are lacking from Richerzhagen, Yamamoto et al., and Merdan et al., this claim is also allowable over these references, individually or combined, and withdrawal of this rejection and allowance of this claim is respectfully requested.

Claims 2, 4, 6-7, and 9:

With respect to claims 2, 4, 6-7, and 9, it is respectfully submitted that for at least the reason that dependent claims 2, 4, 6-7, and 9 depend from independent claim 1, which is allowable for at least the reasons provided above, and therefore contain each of the features as recited in claim 1, dependent claims 2, 4, 6-7, and 9 are also allowable over Richerzhagen, Yamamoto et al., Merdan et al. and Peng et al., either individually or combined.

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Claim 15:

With respect to claim 15, it is respectfully submitted that for at least the reason that dependent claim 15 depends from independent claim 10, which is not rejected as unpatentable over Richerzhagen, Yamamoto et al., Merdan et al. and Peng et al., dependent claim 15 which incorporates all the limitations of claim 10 is also allowable over these references either individually or combined.

Claim 16:

With respect to claim 16, on page 3 of the Office Action of 16 January 2007, the Examiner appears to reject claim 16 for the same reasons as presented to reject independent claim 1. However, Applicant respectfully submits that these references also do not disclose the Applicant's invention as recited in claim 16, either individually or combined.

As described above, while Richerzhagen describes that laser irradiation can be used for "material processing," including cutting, drilling, welding, marking, and material stripping, see Richerzhagen, Col. 1, lines 10-14, Richerzhagen does not disclose, teach or suggest any specific material processed or any specific processing to form a desired feature on a material. Accordingly, the Applicant respectfully submits that Richerzhagen does not teach or suggest any of the features recited in claim 16, and among other things, Richerzhagen does not teach or suggest "forming an ink-jet print head with an ink feeding port on a wafer using a liquid-jet guided laser," and "illuminating a laser beam guided by a liquid-jet having a diameter in the range of 10 to 500 μm through the liquid-jet guided laser," as recited in claim 16.

Furthermore, as described above, Yamamoto et al. describes the formation of a supply port 10, an ink liquid chamber 9, and ink liquid channels 8 on a ceiling plate through injection molding. See Yamamoto et al., Col. 6, lines 19-24. This is not the same as "forming an ink-jet print head with an ink feeding port on a wafer using a liquid-jet guided laser," and "illuminating a laser beam guided by a liquid-jet having a diameter in the range of 10 to 500 μm through the liquid-jet guided laser," as recited in claim 16.

Furthermore, Yamamoto describes the use of an excimer laser, which is not the same as "a liquid-jet guided laser," as recited in claim 16, to form a discharge port 7, which is also not the

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same as "the ink feeding port," as recited in claim 16. Accordingly, neither Richerzhagen nor Yamamoto et al., individually or combined, disclose, teach, or suggest, among other things "forming an ink-jet print head with an ink feeding port on a wafer using a liquid-jet guided laser," and "illuminating a laser beam guided by a liquid-jet having a diameter in the range of 10 to 500 μm through the liquid-jet guided laser," as recited in claim 16.

Instead, the Examiner appears to offer its own hypothesis for expanding the nature of elements of these references, and combining them in ways not present, inherently required, or suggested by any of these references to allege they correspond to the limitations recited in claims 1 and 16. Not only does the Examiner not specifically point out which structures in Richerzhagen or Yamamoto et al. correspond to the limitations of claim 1 and 16, but at best, the Examiner seems to be arguing for impermissible hindsight.

Furthermore, as described above, Merdan et al. describes that a YAG laser, an IR laser, A UV laser, a CO2 laser, a diode laser, or a combination thereof, may be used to process hollow tubes while using a water column flowing through the tube to disrupt the laser energy and prevent the laser from impacting the interior surface of the tube. Accordingly, neither Richerzhagen, Yamamoto et al. nor Merdan et al. teach or suggest, among other things, "forming an ink-jet print head with an ink feeding port on a wafer using a liquid-jet guided laser," and "illuminating a laser beam guided by a liquid-jet having a diameter in the range of 10 to 500 μm through the liquid-jet guided laser," as recited in claim 16.

Moreover, Merdan et al. cannot be used to form an obviousness type rejection because it is not analogous art. Merdan et al. describes the formation of medical stents. See Merdan et al., Col. 15-23. That is, Merdan et al. has nothing to do with the fabrication of ink-jet print heads, and therefore is not in the same field of art as the Applicant's invention. Additionally, Merdan et al. is limited to describing the processing of hollow tubes using a laser, and using a fluid column flowing through the hollow tube to disrupt the laser energy and prevent the laser from impacting an interior surface of the hollow tube. See Merdan et al., Col. 5, lines 32-34, and 37-47. That is, Merdan et al. is not pertinent to the problem of forming an ink feeding port through a wafer which constitutes an ink jet print head as addressed by the Applicant's invention. Thus, Merdan et al. is not analogous art with respect to the Applicant's invention, and therefore cannot be used in combination with Richerzhagen, Yamamoto et al., or Peng et al. to

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form an obviousness type rejection. Thus, at least for the reason that the rejection of claim 16 in view of Richerzhagen, Yamamoto et al., Merdan et al. and Peng et al. is left unsupported, withdrawal of this rejection and allowance of this claim is respectfully requested.

Additionally, as described above, the Examiner cites Peng et al. merely to allege that it "discloses the use of laser beam liquid assembly for the dicing of wafers", and that "[t]he liquid stream has a diameter equal to the laser beam diameter, which is about 50 to 150 μm ." However, for at least the reason that Peng et al. does not disclose, teach, or suggest, any of the limitations that are lacking from Richerzhagen, Yamamoto et al., and Merdan et al., this claim is also allowable over these references, individually or combined, and withdrawal of this rejection and allowance of this claim is respectfully requested.

Claims 17-22

With respect to claims 17-22 it is respectfully submitted that for at least the reason that dependent claims 17-22 depend from independent claim 16, which is allowable for at least the reasons provided above, and therefore contain each of the features as recited in claim 16, dependent claims 17-22 are also allowable over Richerzhagen, Yamamoto et al., Merdan et al. and Peng et al., either individually or combined.

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Rejection under 35 USC § 103(a): Richerzhagen, Yamamoto, Merdan, Peng, and Hashimoto:

Claims 8 and 10-14 have been rejected under 35 U.S.C. §103(a) as being unpatentable over Richerzhagen, Yamamoto et al., Merdan et al. and Peng et al., and further in view of U.S. Publication No. 2004/0246292 to Hashimoto et al. The Applicant respectfully traverses this rejection for at least the following reasons

Claim 8:

With respect to claim 8, it is respectfully submitted that for at least the reason that dependent claim 8 depends from independent claim 1, which is allowable over Richerzhagen, Yamamoto et al., Merdan et al. and Peng et al. for at least the reasons pointed out above, and therefore contains each of the features as recited in claim 1, dependent claim 8 is also allowable over these references.

Further, the Examiner cites Hashimoto et al. merely to allege it discloses "separation of a silicon wafer in the manufacturing [of a] ink jet head." See Office Action of 16 January 2007, page 5. However, for at least the reason that Hashimoto et al. does not teach any of the limitations which are lacking in Richerzhagen, Yamamoto et al., Merdan et al. and Peng et al., Claim 8 is allowable over Richerzhagen, Yamamoto et al., Merdan et al., Peng et al., and Hashimoto et al., separately or combined, and withdrawal of this rejection and allowance of this claim are respectfully requested.

Claim 10:

With respect to claim 10, on page 3 of the Office Action of 16 January 2007, the Examiner rejects claim 10 for the same reasons as presented to reject independent claim 1 with respect to Richerzhagen, Yamamoto et al., Merdan et al., and Peng et al. The Examiner then admits that "Richerzhagen does not teach dicing of a wafer," but states that Hashimoto et al. discloses "separation of a silicon wafer in the manufacturing [of a] ink jet head," and that "[i]t

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would have been obvious... to dice a wafer, as taught by Hashimoto et al. in the Richerzhagen system. See Office Action of 16 January 2007, pages 4-5. However, Applicant respectfully submits that these references do not disclose the Applicant's invention as recited in claim 10, either individually or combined.

As described above, Richerzhagen describes an arrangement to couple a laser beam with a fluid jet for material processing, focusing on preventing damage to the fluid jet nozzle by laser radiation. See Richerzhagen, Col. 1, lines 62-67. That is, while Richerzhagen describes that laser irradiation can be used for "material processing," including cutting, drilling, welding, marking, and material stripping, see Richerzhagen, Col. 1, lines 10-14, Richerzhagen does not disclose, teach or suggest any specific material processed or any specific processing to form a desired feature on a material. Accordingly, the Applicant respectfully submits that Richerzhagen does not teach or suggest any of the features recited in claim 10, and among other things, Richerzhagen does not teach or suggest "a dicing process of dicing a wafer formed with a plurality of print heads using a liquid-jet guided laser, wherein: the dicing process comprises: fixing the wafer to a stage of a chamber, and dicing the wafer using the liquid-jet guided laser," and "illuminating a laser beam guided by a liquid-jet having a diameter in the range of 10 to 500 μm through the liquid-jet guided laser, and moving the stage, on which the wafer is fixed, along a dicing pattern; and the laser beam comprises one of a diode-pumped solid laser beam and a gas laser beam," as recited in claim 10.

Furthermore, Yamamoto describes the use of an excimer laser, which is not the same as "a liquid-jet guided laser," as recited in claim 10. Accordingly, neither Richerzhagen nor Yamamoto et al., individually or combined, disclose, teach, or suggest, among other things "a dicing process of dicing a wafer formed with a plurality of print heads using a liquid-jet guided laser, wherein: the dicing process comprises: fixing the wafer to a stage of a chamber, and dicing the wafer using the liquid-jet guided laser," and "illuminating a laser beam guided by a liquid-jet having a diameter in the range of 10 to 500 μm through the liquid-jet guided laser, and moving the stage, on which the wafer is fixed, along a dicing pattern; and the laser beam comprises one of a diode-pumped solid laser beam and a gas laser beam," as recited in claim 10.

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Moreover, Merdan et al. describes the processing of hollow tubular members, suitable for implantation into the human body lumen and coated with lubricants or drug vectors, using a laser. See Merdan et al., Col. 4, lines 16+, Col. 5, 1-27. Further, Merdan et al. limits the types of lasers its system uses to lasers "suitable for use in processing tubular members," see Merdan et al., Col. 5, lines 32-34, and uses a fluid column flowing through the inside of the hollow tubular member to prevent the laser used from impacting an interior surface of the tubular member as it's being processed. See Merdan et al., Col. 5, lines 37-47. That is, Merdan et al. describes that a YAG laser, an IR laser, a UV laser, a CO2 laser, a diode laser, or a combination thereof, may be used to process hollow tubes while using a water column flowing through the tube to disrupt the laser energy and prevent the laser from impacting the interior surface of the tube. Accordingly, neither Richerzhagen, Yamamoto et al. nor Merdan et al. teach or suggest, among other things, "a dicing process of dicing a wafer formed with a plurality of print heads using a liquid-jet guided laser, wherein: the dicing process comprises: fixing the wafer to a stage of a chamber, and dicing the wafer using the liquid-jet guided laser," and "illuminating a laser beam guided by a liquid-jet having a diameter in the range of 10 to 500 μm through the liquid-jet guided laser, and moving the stage, on which the wafer is fixed, along a dicing pattern; and the laser beam comprises one of a diode-pumped solid laser beam and a gas laser beam," as recited in claim 10.

Furthermore, Merdan et al. cannot be used to form an obviousness type rejection because it is not analogous art. Merdan et al. describes the formation of medical stents. See Merdan et al., Col. 15-23. That is, Merdan et al. has nothing to do with the fabrication of ink-jet print heads, and therefore is not in the same field of art as the Applicant's invention. Additionally, Merdan et al. is limited to describing the processing of hollow tubes using a laser, and using a fluid column flowing through the hollow tube to disrupt the laser energy and prevent the laser from impacting an interior surface of the hollow tube. See Merdan et al., Col. 5, lines 32-34, and 37-47. That is, Merdan et al. is not pertinent to the problem of forming an ink feeding port through a wafer which constitutes an ink jet print head as addressed by the Applicant's invention.

Accordingly, Merdan et al. is not analogous art with respect to the Applicant's invention, and therefore cannot be used in combination with Richerzhagen, Yamamoto et al., Peng et al.

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and Hashimoto et al. to form an obviousness type rejection. Thus, at least for the reason that the rejection of claim 10 in view of Richerzhagen, Yamamoto et al., Merdan et al., Peng et al., and Hashimoto et al. is left unsupported, withdrawal of this rejection and allowance of this claim is respectfully requested.

With respect to Peng et al., the Examiner cites Peng et al. merely to allege that it "discloses the use of laser beam liquid assembly for the dicing of wafers", and that "[t]he liquid stream has a diameter equal to the laser beam diameter, which is about 50 to 150 μm ." However, for at least the reason that Peng et al. does not disclose, teach, or suggest, any of the limitations that are lacking from Richerzhagen, Yamamoto et al., Merdan et al., and Hashimoto et al. this claim is also allowable over these references, individually or combined, and withdrawal of this rejection and allowance of this claim is respectfully requested.

Further, the Examiner cites Hashimoto et al. merely to allege it discloses "separation of a silicon wafer in the manufacturing [of a] ink jet head." See Office Action of 16 January 2007, page 5. However, for at least the reason that Hashimoto et al. does not teach any of the limitations which are lacking in Richerzhagen, Yamamoto et al., Merdan et al. and Peng et al., Claim 10 is allowable over Richerzhagen, Yamamoto et al., Merdan et al., Peng et al., and Hashimoto et al., separately or combined, and withdrawal of this rejection and allowance of this claim are respectfully requested.

Claim 11-14:

With respect to claims 11-14 it is respectfully submitted that for at least the reason that dependent claims 11-14 depend from independent claim 10, which is allowable for at least the reasons provided above, and therefore contain each of the features as recited in claim 10, dependent claims 11-14 are also allowable over Richerzhagen, Yamamoto et al., Merdan et al., Peng et al., and Hashimoto et al. either individually or combined.

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Restriction Requirement

The Examiner asserts that claims 23-27, which were added by the June 28, 2006, Amendment, "are directed to an invention that is independent or distinct from the invention originally claimed" (claims 1-22). However, the Examiner provides no reasons why claims 23-27 are independent or distinct from claims – other than to merely paraphrase claim 23. In addition, the Examiner has provided no reasons why there would be a serious burden on the Examiner absent such a restriction. See MPEP §808, which requires that the Examiner provide (1) reasons for the restriction (as opposed to a summary of one of the restricted claims) and (2) reasons why there would be a serious burden without the restriction. Because the Examiner has provided neither (1) nor (2), Applicants respectfully submit that the Restriction Requirement is improper.

Furthermore, Applicants respectfully submit that the subject matter of all of claims 1-27 is sufficiently related and that a thorough search for the subject matter of claims 1-22 would necessarily encompass a search for the subject matter of claims 23-27. Thus, it is respectfully submitted that the search and examination of the entire application could be made without serious burden. See MPEP §803, which states that: "if the search and examination of all the claims in an application can be made without serious burden, the Examiner must examine them on the merits, even though they include claims to independent or distinct inventions" (emphasis added). It is respectfully submitted that this policy should apply in the present application in order to avoid unnecessary delay and expense to Applicants and duplicative examination by the Patent Office.

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Response dated: March 27, 2007
Reply to the Office Action of January 16, 2007

Conclusion

It is respectfully submitted that a full and complete response has been made to the outstanding Office Action and, as such, there being no other objections or rejections, this application is in condition for allowance, and a notice to this effect is earnestly solicited.

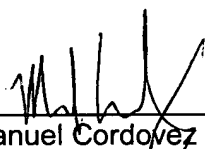
If the Examiner believes, for any reason, that personal communication will expedite prosecution of this application, the Examiner is invited to telephone the undersigned at the number provided below.

If any further fees are required in connection with the filing of this amendment, please charge the same to our Deposit Account No. 502827.

Respectfully submitted,

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